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Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

SUBJECT:	Applicants:	Fredberg et al.
	Serial No:	10/621,155
	Filed:	July 16, 2003
	For:	RIGID RADOME WITH POLYESTER-POLYARYLATE FIBERS AND A METHOD OF MAKING SAME
	Examiner:	Michael C. Wimer
	Group:	2828
	Docket No:	RAY-133J

Dear Sir:

Enclosed are three (3) copies of an Appeal Brief for the subject application and a check for $500.00 as required under 37 C.F.R. §41.20(b)(2).

If for any reason this Appeal Brief is found to be INCOMPLETE, or if at any time it appears that a TELEPHONE CONFERENCE with counsel would help advance prosecution, please telephone the undersigned or his associates collect in Waltham, Massachusetts, at (781) 890-5678.

If any payment during prosecution is found to be incorrect, please charge any deficiency or credit any overpayment to my Deposit Account No. 09-0002. A copy of this letter is enclosed for use by the Finance Branch, in the event that it is necessary to make any charge or credit to my deposit account.

In addition, pursuant to Rule 1.136 including Rule 1.136(a)(3), the Office is hereby authorized to treat any this filing and any future reply or filing requiring an extension of time as incorporating a request therefor. Also, any request or Petition for an Extension of

Time notwithstanding an inadvertent reference in the Petition to a shorter period of time is to be treated as requesting the appropriate length of time.

Kindly acknowledge receipt of the foregoing by returning the enclosed self-addressed postcard.

Sincerely,

Thomas E. Thompkins, Jr.
Reg. No. 47,136

TET:wj
Enclosures

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I hereby certify that the attached correspondence is being deposited with the United States Postal Service, Express Mail Certificate No. EV627772384US, in an envelope addressed to: Mail Stop Appeal Brief - Patents, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on August 25, 2005.

Wynne D. Janis

APPEAL BRIEF

FOR APPLICATION SERIAL NO. 10/621,155

TITLE:
RIGID RADOME WITH POLYESTER-POLYARYLATE FIBERS AND A METHOD OF MAKING SAME

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TABLE OF CONTENTS

TABLE OF CASES

I. REAL PARTY IN INTEREST

The real party in interest is the assignee of the subject patent application, Raytheon Company, a Delaware corporation having its principal place of business at 870 Winter Street, Waltham, Massachusetts 02451 (formerly of Lexington, Massachusetts).

II. RELATED APPEALS AND INTERFERENCES

The appellants are not aware of any related appeals, interferences or judicial proceedings which may be related to, would directly affect or be directly affected by, or have a bearing on, the Board's decision in this pending appeal. The appellants note for the record however that the Examiner in co-pending U.S. Patent Application Serial No. 10/620,884 rejected the pending claims thereof provisionally under the judicially created doctrine of obviousness-type double patenting as being unpatentable over the claims of the application on appeal. The applicants in Ser. No. 10/620,884 traversed the double patenting and other rejections.

III. STATUS OF CLAIMS

The status of the claims is as follows: all the claims (1-24) of the subject patent application were rejected in the (second and) Final Office Action mailed February 10, 2005. Claims 1-24 are being appealed and are set forth in the Claims Appendix.

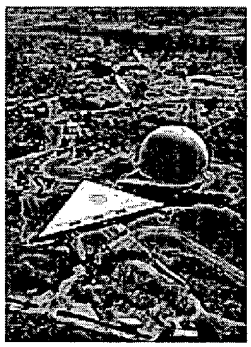
IV. STATUS OF AMENDMENTS

No amendments to the claims were filed either prior or subsequent to the final rejections. All of the pending and appealed claims are original.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The claimed subject matter relates to a high strength rigid radome or feedome material including polyester-polyarylate fibers. Those particular fibers reduce radio frequency transmission losses and yet provide improved structural strength.

A radome is a shelter for radar or communication antennas and equipment. Here is a picture of a large radome at the Telecommunications Museum of Pleumeur – Bodou in France:



The number one engineering consideration in radome design is the selection of the material used to make the radome. The radome material must protect the antenna equipment housed within the radome and yet also not interfere with signals received or transmitted by the antenna equipment. Engineering compromises are always made in radome design as no known material provides the best structural protection and yet also ensures there are no signal losses.

Radomes serve as protection from thermal distortions, sunlight, rain, and other elements. Most conventional rigid radomes are manufactured using a system of composite materials as the walls of the radome. At the time of the applicants' claimed invention, the state of the art in composite radome design relied on glass or quartz fibers in a rigid matrix resin material in order to withstand natural and induced environmental conditions. Kevlar was also sometimes used.

One drawback of such conventional rigid radomes is the resulting radio frequency (RF) transmission loss and also a loss of receiving sensitivity. While providing adequate structural integrity, these existing radomes and feedomes exhibit RF transmission losses in both transmit and receive modes. To account for these losses, the power of the electronic system protected by the radome must be increased, resulting in added costs or a sacrifice of system performance.

Thus, given the requirements for structural integrity and low RF transmission losses, it is necessary to balance the mechanical and electrical composite material properties and select from among available material combinations to satisfy the radio frequency electrical performance requirements while also meeting the structural demands of the radome.

The claimed rigid radome of the subject invention improves on the shortcomings of prior rigid radomes made with conventional materials. The inventors have achieved an improved balance of electrical and mechanical qualities with the claimed high strength rigid radome. The claimed rigid radome includes polyester-polyarylate fibers in a rigid matrix material instead of glass or quartz fibers or other conventional known or used materials resulting in low RF losses and high structural and mechanical integrity. There are five independent claims, claims 1, 12, 13, 22 and 24. All five independent claims recite the use of polyester-polyarylate fibers in a radome.

A. INDEPENDENT CLAIM 1

Independent claim 1 recites a radome or a feedome comprising at least one rigid panel including composite material having polyester-polyarylate fibers in a rigid resin matrix material.

As set forth in the subject application, the subject matter of independent claim 1 is a radome (such as a ground-based radome 10, a naval radome 12, or an aircraft blister radome 14, Figs. 1, 2 and 3) or a feedome (such as feedome 16, Fig. 4) comprising at least one rigid panel 60 including composite material having polyester-polyarylate fibers 70 in a rigid resin matrix material 26'. See e.g. Fig. 6. See also the specification, i.e. at page 6, lines 2-5; page 7, lines 9-10; and page 11, lines 14-16 and 20-23. See also page 3, lines 20-22 of the specification.

B. INDEPENDENT CLAIM 12

Claim 12 recites a radome or feedome comprising at least one rigid panel including composite material skins with polyester-polyarylate fibers in a rigid resin matrix material and a core therebetween.

Radome 10, 12, or 14 or feedome 16 comprises at least one rigid panel 60 including composite material skins 20' and 22' with polyester-polyarylate fibers 70 in a rigid resin matrix material 26' and a core 24' therebetween. See e.g. Figs. 1-4 and 6. See also the specification, i.e. at page 6, lines 2-5; page 7, lines 9-10; and page 11, line 14 through page 12, line 2. See also page 4, lines 7-9 of the specification.

C. INDEPENDENT CLAIM 13

Claim 13 recites a radome or feedome with reduced frequency loss comprising a first skin including polyester-polyarylate fibers in a rigid resin matrix material, a second skin including polyester-polyarylate fibers in a rigid resin matrix material, and a core disposed between the first and second skins.

Radome 10, 12, or 14 or feedome 16 comprises first and second skins 20' and 22' each including polyester-polyarylate fibers 70 in a rigid resin matrix material 26', and a core 24' disposed between the first skin 20' and the second skin 22'. See e.g. Figs. 1-4 and 6. See also the specification, i.e. at page 6, lines 2-5; page 7, lines 9-10; and page 11, line 14 through page 12, line 2. See also page 4, lines 10-13 of the specification.

D. INDEPENDENT CLAIM 22

Claim 22 recites a method of producing a radome or feedome. The method comprises forming at least one rigid panel including composite material having polyester-polyarylate fibers

in a rigid resin matrix. See e.g. Figs. 1-4 and 6. See also the specification, i.e. at page 6, lines 2-5; page 7, lines 9-10; and page 11, lines 14-16 and 20-23. See also page 4, lines 18-20 of the specification.

E. INDEPENDENT CLAIM 24

Claim 24 recites a method of producing a radome or feedome. The method comprises forming a first skin comprised of polyester-polyarylate fibers in a rigid resin matrix, forming a second skin comprised of polyester-polyarylate fibers in a rigid resin matrix, disposing a core between the first and second skins, and bonding the skins to the core. See e.g. Figs. 1-4 and 6. See also the specification, i.e. at page 6, lines 2-5; page 7, lines 9-10; and page 11, line 14 through page 12, line 2. See also page 4, line 23 through page 5, line 3 of the specification.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1-24 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 4,506,269 to *Greene* in view of U.S. Patent No. 5,360,503 to *Coffy*.

VII. ARGUMENT

CLAIMS 1-24

A. SUMMARY OF THE ARGUMENT

In contrast to prior art which taught quartz or glass fibers in a resin matrix for use in radomes, the applicants claim using polyarylate fibers in a rigid resin matrix material. The result is a radome which is structurally sound and also exhibits decreased RF losses.

The *Greene* reference does indeed relate to a radome. Although, *Greene* considered polyarylate as a possible radome material, *Greene* rejected that material in favor of a

polycarbonate material. Polyarylate fibers in a rigid resin matrix material as claimed by the applicants was not even considered by *Greene*.

Coffy does not relate to radomes. Instead, *Coffy* relates to polyarylate fibers in a resin matrix generally. The reason *Coffy* favors polyarylate fibers in a resin matrix is because such a material allegedly does not decompose in the presence of sunlight. *Coffy* never suggests that such a material would be advantageous to use in designing radomes.

The Examiner is wrong that *Coffy* suggests the use of liquid crystal polymers or polyester polyarylate fibers in radomes. The Examiner is also wrong that *Greene's* teaching of "alternate materials" is a suggestion to use such liquid crystal polymers in radomes.

Invention can lie in the selection of a known material for use in a device when no one had ever used that material in the device before. Carbonized materials were known when Edison first used them in a light bulb and so too was tungsten when David Coolidge of GE first employed tungsten for the filament of a light bulb.

For a more present day example, aerogel, the world's lightest substance, was invented years ago but the Patent Office continues to allow patents claiming novelty in the use of Aerogel in different ways. See, e.g., Patent No. 6,887,563. Plastic leaf bags were also not new and neither was the idea of decorating bags and other articles to look like a Jack-O-Lantern when Anita Dembiczak invented the idea of a plastic leaf bag decorated to look like a Jack-O-Lantern. Nevertheless, the Federal Circuit held Ms. Dembiczak's invention was patentable. See In re Dembiczak, 179 F.3d 994, 50 USPQ 2d 1614 (Fed. Cir. 1999) (abrogated on other grounds, In re Gartside, 203 F.3d 1305, 53 USPQ 2d 1769 (Fed. Cir. 2000)).

Similarly, radomes are not new (as evidenced by *Greene*) and neither is a material constituting polyester-polyarylate fibers in a resin matrix (as evidenced by *Coffy*). The Examiner has uncovered both of these references and opines that their combination renders a patent claim

reciting the use of that material in a radome is obvious.

But that is not the proper legal analysis regarding obviousness. Instead, the proper question is whether one of ordinary skill in the art, without the benefit of the applicants' disclosure, would: a) read *Greene* and note the discussion there about selecting the appropriate materials for the design of a radome, i.e. column 1, lines 51-57; b) ignore the remainder of *Greene* advocating the use of materials other than polyester-polyarylate fibers in a resin matrix; and then c) turn instead to *Coffy* who teaches using polyester-polyarylate fibers in a resin matrix but not in radomes and not because of the electrical characteristics of that material but, instead, because that material allegedly does not decompose in sunlight.

A skilled artisan would not ignore the entirety of the teaching of *Greene* which advocates the use of materials other than polyester-polyarylate fibers in a resin matrix for a radome.

The law is clear that one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention. In re Fine, 837, F.2d 1071, 5 USPQ 1596, 1600 (Fed. Cir. 1988).

Coffy, like many patents, asserts his material has wide applicability (space, aeronautical, avionics, nautical, automatic, competition sports fields) because the material allegedly does not decompose when subjected to UV, visible, and microwave radiation. See *Coffy*, column 1, lines 24-29 and column 3, lines 27-30. But, such a generalized suggested use of such a material does not necessarily suggest to one skilled in the art that a radome could be made of that material to improve the electrical performance of the radome. People knew leaf bags could also be put to many different uses when Ms. Dembiczak invented the Jack-O-Lantern leaf bag but her claims were held non-obvious just the same once the proper legal standard was applied by the Federal Circuit.

Thus, one of ordinary skill in the art would not view the Examiner's proposed combination of *Greene* and *Coffy* as rendering the applicants' claimed invention obvious.

All of the arguments herein apply to claims 1-24. Additionally, independent claims 12, 13, and 24, as well as dependent claims 5-10, 11, 21, and 16-20, are separately patentable for the additional reasons at the end of argument section VII (particularly sections VII.D, VII.E, and VII.F).

B. U.S. PATENT NO. 4,506,269 TO *GREENE*

The applicants understand that the rejections are based on 35 U.S.C. §103, not §102. However, it is well established that "teaching away" by one reference is an important *indicium* of non-obviousness. See e.g. W.L. Gore & Assocs., Inc. v. Garlock, Inc., 721 F.2d 1540, 220 USPQ 303, 311 (Fed. Cir. 1983) (in considering claims under §103, "the district court erred ... in considering claims in less than their entireties, i.e., in disregarding disclosures in the references that diverge from and teach away from the invention at hand") (with emphasis added). See also In re Hedges, 783 F. 2d 1038, 228 USPQ 685, 687 (Fed. Cir. 1987):

> It is impermissible within the framework of §103 to pick and choose from any one reference only so much as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art.

Simply stated, *Greene* teaches away from the applicants' claimed invention.

Greene teaches a radome wall sandwich structure capable of withstanding continuous rain impact at a constant speed of 500 mph for a minimum of one hour without showing harmful effects. See *Greene*, column 2, line 66 through column 3, line 3. *Greene* emphasizes the necessity of greater buckling resistance via a sandwich wall construction with two skins and a

core therebetween. See *Greene* column 1, lines 65-68 and the Abstract.

Greene is cited by the Examiner as a primary reference to show the general teaching of a radome. However, to achieve a desired optimum dielectric value for use in the radar range, *Greene* does not teach the use of any fibers in the skins which could result in decreased RF transmission loss. Thus, *Greene* does not teach or suggest the use of the applicants' claimed polyester-polyarylate fibers. Instead, *Greene* teaches adjusting the percentage of core solid material to air space in order to reach optimum dielectric value for use in the radar range. See e.g. *Greene* column 4, lines 17-31; column 7, lines 47-50 and the Abstract where it states in pertinent part:

> The core, as determined from the electrical design, is achieved by balancing the correct amount of solid material with air. For example, for an overall outside core dielectric constant (E) of 1.30, a polycarbonate dielectric constant of 2.76 at 10 GHz and a dielectric constant of 1.0 for air, the percentage of solid material is then approximated by the following relationship as shown in Equation I:
>
> $$E_{solid}(\%solid) + E_{air}(100 - \%solid) = E_{overall}(100)$$
>
> Substituting the above dielectrics, the percent solid computes to 17% and 83% for air. The percentage of solid material needed for the bottom core is calculated similarly...
>
> The wall thickness of tubes 34 can be varied to change the dielectric constant thus reducing machining requirements as required in wall 13 design...
>
> The percentage of core material to air is adjusted by electrical tuning to make the optimum dielectric value for use in the gigahertz radar frequency range.

This disclosure teaches away from using special fibers in the radome wall to minimize electrical losses by instead teaching balancing solid material with air to achieve a desired dielectric constant. Moreover, *Greene* teaches that a number of skin materials were under

consideration, including polyarylate[1], yet *Greene* teaches that "[a]fter careful examination polycarbonate [not polyarylate] was chosen as the optimum material for this particular radome application". See *Greene* column 6, lines 31-37, with emphasis and bracketed phrase added.

This disclosure also teaches away from using polyarylate in general whether it be in the form of fibers or otherwise in the design of a radome.

C. U.S. PATENT NO. 5,360,503 TO *COFFY*

Coffy is cited by the Examiner as the secondary reference. However, *Coffy* fails to teach or suggest a radome or feedome as claimed by the applicants. Like *Greene*, *Coffy* also teaches away from a number of the applicants' claims.

Coffy teaches generally a "semi-finished product" and thermoplastic composite material having liquid crystal polymers and a process for the production of the material. The principal goal of *Coffy* is to produce light-weight mechanical parts having high mechanical strength characteristics. See e.g. the title of the *Coffy* patent, and column 1, lines 24-29.

Also -- as many patents do -- *Coffy* asserts that this material may have wide applicability such as space, aeronautical, avionics, car, nautical and sports fields. See e.g. column 1, lines 24-29. However, such a generalized suggested use of such a material does not necessarily suggest to one skilled in the art that a radome could be made of *Coffy's* composite material. At least one Office Action has pointed out that *Coffy* notes that in one example the composite material obtained has a remarkable transparency to electromagnetic waves. Those skilled in the art, however, would not then automatically conclude that *Coffy's* material could be used in radomes. *Coffy's* statement can only be properly understood in the context of the entirety of *Coffy's* teachings. See, e.g. *Coffy* at column 3, lines 27-29 where it states:

[1] As noted, *Greene* does not teach polyarylate fibers for reinforcement or otherwise.

> Moreover, the liquid crystal polymers can be exposed to radiation (UV, visible, microwave) without decomposing ...

Thus, one skilled in the art would readily understand the reason *Coffy* states his fabric has transparency to electromagnetic waves is because otherwise the fabric, when used in space, aeronautical, avionics, car, nautical, and competition sports fields, would decompose in the presence of UV, visible, and microwave radiation.

There is simply no suggestion in *Coffy* regarding the use of his fabric in radomes, nor is there any discussion in *Coffy* relating to the electrical and structural considerations involved in radome design. *Coffy* fails to teach or suggest that the disclosed fabric can or should be used for radomes, or why it would be advantageous to do so, and *Coffy* fails to teach or suggest the considerations involved in fabricating a radome: structural integrity, low transmission losses, and the engineering trade-offs between structural integrity and transmission losses.

Coffy fails to teach those skilled in the art that fibers in the skin of a radome can lower transmission losses. At best, those skilled in the art reading *Coffy* would understand that his fabric does not decompose in the presence of radiation,[2] not that the fibers help lower RF transmission losses in a radome. Thus, those skilled in the art would not read *Coffy* as proposing a suitable fabric for use in radomes.

Moreover, *Coffy* relates to a fabric which is made *exclusively* of liquid crystal polymers as both the fibers and the resin matrix material in order to eliminate known problems if different materials are used for the fibers and matrix. See e.g. *Coffy* column 1, lines 30-35; column 1, line 65 through column 2, line 9; column 6, lines 27-39; and the Abstract. *Coffy* teaches a

[2] The applicants believe that *Coffy* is incorrect, and that LCPs would indeed decompose upon exposure to UV radiation, but this does not change the fact that *Coffy*'s alleged lack of decomposition is far from a teaching that the fibers help lower RF transmission losses in a radome.

thermoplastic composite product consisting exclusively of liquid crystal thermoplastic polymers. *Coffy* teaches the use of reinforcing fibers and matrix of the same chemical nature or natures that are very similar to one another, to avoid interface problems between fibers and a matrix having different physicochemical natures. See *Coffy* column 1, lines 30-35 and column 1 line 65 through column 2, line 9.

Thus, *Coffy* teaches away from a number of the applicants' dependent claims which recite that rigid resin matrix material is a different material than the fibers.[3] Moreover, *Coffy* fails to teach skins and a core therebetween recited in a number of the applicants' independent claims.

It is not permitted to base a rejection on part of a reference if other parts of the reference are necessary to fully appreciate the teaching of the reference.

> It is impermissible within the framework of §103 to pick and choose from any one reference only so much as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art.

See In re Hedges, 783 F.2d 1038, 228 USPQ 685, 687 (Fed. Cir. 1986) (citations and quotations omitted).

In summary, *Coffy* fails to teach or suggest a radome with polyester-polyarylate fibers, and teaches away from many of the applicants' claims by virtue of the teaching that a composite material should be made *exclusively* of liquid crystal polymers.

Thus, the rejections based on *Coffy* are impermissible. A full appreciation of *Coffy* does not fairly suggest *Coffy*'s composite for use in a radome to one skilled in the art, and in fact *Coffy*

[3] See, e.g. applicants' claims 5-10 and 16-20, discussed in further detail *infra*.

teaches away from many of the applicants' claims.

D. THE REJECTION BASED ON THE COMBINATION OF *GREENE* AND *COFFY*

The novel and non-obvious nature of the applicants' claimed invention is clear because in order to reject the applicants' claims, it was necessary to combine two diametrically opposing references.[4] *Greene* and *Coffy* are not properly combinable as a matter of law.

Greene teaches that, after consideration of a number of materials for a radome material, the optimum material for its radome is polycarbonate -- not polyarylate. In other words, *Greene*, in designing radomes, rejects *Coffy's* teachings because *Coffy* teaches a composite part made exclusively of liquid crystal polymers. Thus, the use of liquid crystal polymer as taught by *Coffy* would destroy the optimum functionality of the radome taught by *Greene*.

To form the radome, *Greene* teaches separate materials (i.e. polycarbonate) held together by other materials (i.e. polyurethane). See e.g. *Greene* column 7, lines 51-61. In sharp contrast, *Coffy* teaches the exclusive use of one material to form the composite, in order to avoid alleged interface problems between fibers and a matrix having different physiochemical natures. Thus, the use of different materials as taught by *Greene* would destroy the optimum functionality of the composite material taught by *Coffy*.

To reach an optimum dielectric constant, *Greene* teaches adjusting, in the core, the percentage of solid material to air space. *Coffy* fails to teach anything about an optimum dielectric constant much less a special core.

For structural support, to withstand rain impacts, and to increase buckling resistance, *Greene* teaches a radome made of a sandwich structure wall. *Coffy* does not.

[4] The Examiner has rejected claims 1-24 based on *Greene* and *Coffy*.

The Examiner can satisfy the burden of showing obviousness of the combination *only* by showing some *objective teaching* in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references. In re Sang Su Lee, 277 F.3d 1338, 61 USPQ 2d 1430, 1433-44 (Fed. Cir. 2002).

In this case, the burden cannot be satisfied because the cited references are antithetical to one another, and combining the teachings of *Greene* and *Coffy* would destroy some of their respective principal functions. Thus, one of ordinary skill in the art would not be lead to combine these cited references.

The law is further clear that the teaching of the desirability of combining the references must not come from the applicant's invention. "There must be a reason or suggestion in the art for selecting the procedure used, *other* than the knowledge learned from the applicants' disclosure." See In re Dow Chemical Company, 837 F.2d 469, 5 USPQ 2d 1529, 1532 (Fed. Cir. 1989) (with emphasis added).

The Patent Office is required to show motivation to combine references by making specific findings of fact regarding the level of skill in the art, the relationship between the fields of, in this case, radome design and composite material design, and particular features of the prior art *references* that would motivate one of ordinary skill in the art to select elements disclosed in references from different fields. See, e.g. In re Dembiczak, 175 F.3d 994, 50 USPQ 2d 1614, 1618 (Fed. Cir. 1999) (abrogated on other grounds, In re Gartside, 203 F.3d 1305, 53 USPQ 2d 1769 (Fed. Cir. 2000)).

In summary, the Examiner's rejections have improperly combined a) *Greene* which concerns a radome with a sandwich wall structure for support and strength made of polycarbonate rather than polyarylate and an adjustment of the core solid to air space to reach an optimum dielectric constant with b) *Coffy* which concerns a general use composite material made

exclusively of polyarylate to eliminate material interface problems and to reduce decomposition caused by radiation.

Greene prefers polycarbonate resin not polyester polyarylate fibers as claimed by the applicants. To increase electrical performance, *Greene* prefers adjusting the ratio of air to solid material in the core; not the use of polyester polyarylate fibers in the skins as claimed by the applicants. *Coffy* teaches a general purpose material with liquid crystal polymer resin and fibers. But, *Coffy* teaches nothing about the electrical performance of radomes.

The disconnect between *Greene* and *Coffy* to one skilled in the art is thus readily apparent.

> Our case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine the references ...
>
> Combining prior art references without evidence of such a suggestion, teaching or motivation simply takes the inventor's disclosure as a blueprint for piecing together the prior art to defeat patentability – the essence of hindsight ...
>
> The range of sources available, however, does not diminish the requirement for actual evidence. That is, the showing must be clear and particular ... Broad conclusory statements regarding the teaching of multiple references, standing alone, are not "evidence".

See In re Dembiczak, 175 F.3d 994, 50 USPQ 2d 1614, 1617 (Fed. Cir. 1999) (abrogated on other grounds, In re Gartside, 203 F.3d 1305, 53 USPQ 2d 1769 (Fed. Cir. 2000)) with citations and quotations omitted.

Thus, obviousness has not been established by objective teaching, without benefit of the applicants' claimed invention. The cited references do not teach the desirability of making the specific combination claimed by the applicants.

E. DEPENDENT CLAIMS 5-10 AND 16-20

Coffy teaches away from the applicants' dependent claims 5-10 which depend from independent claim 1 and 16-20 which depend from independent claim 13.

Independent claims 1 and 13 recite polyester-polyarylate fibers in a rigid resin matrix, and dependent claims 5-10 and 16-20 recite a particular rigid resin matrix material, none of which is polyester-polyarylate. As discussed above, *Greene* does not teach the use of fibers at all. *Coffy* teaches a product consisting exclusively of one material to avoid alleged interface problems between fibers and a matrix having different physiochemical natures.

Thus *Coffy* teaches away from the applicants' dependent claims 5-10 and 16-20 which claim a rigid resin matrix material different than the polyester-polyarylate fibers.

F. DEPENDENT CLAIMS 11 AND 21

Greene and *Coffy* fail to teach the particular elements of applicants' claim 11 which depends from independent claim 1 and claim 21 which depends from independent claim 13.

Dependent claims 11 and 21 recite a particular size range for the polyester-polyarylate fibers, namely between 100 denier and 5000 denier. *Greene* does not teach fibers at all and *Coffy* fails to teach or suggest any particular size for the fibers. It is only the applicants' claimed radome that includes polyester-polyarylate fibers. Balancing radome strength with RF transmission losses by using polyester-polyarylate fibers in a radome was not considered by *Coffy*. There is no objective evidence of record that either *Greene* or *Coffy* or their combination teach or suggest to one of ordinary skill in the art concerning the claimed size of the polyester-polyarylate fibers for a radome.

G. INDEPENDENT CLAIMS 12, 13, AND 24

Independent claim 12 recites a radome or feedome comprised of composite material skins with polyester-polyarylate fibers in a rigid resin matrix material and a core therebetween. Independent claims 13 and 24 each recite a radome including first and second skins including polyester-polyarylate fibers in a rigid resin matrix material and a core disposed between the first and second skins. *Coffy* fails to teach: a radome; multiple skins; or multiple skins and a core. Accordingly, *Coffy* teaches away from applicants' independent claims 12, 13, and 24.

H. THE ADVISORY ACTION

The Advisory Action explains that *Greene* is cited as a general representation of antenna radome prior art, and that column 1, lines 33-57 of *Greene* discusses the problems of prior art radomes, and suggests that selection of alternate materials must be performed while maintaining electrical performance and dielectric strength.[5] The Advisory Action further states that those "are two reasons precisely why the skilled artisan would look to *Coffy*".

This is not accurate. The discussion in *Greene* regarding prior art problems is not to lead a skilled artisan to *Coffy*, but to show the improvements on the prior art made by Greene. This is clear from *Greene* itself, which states at column 1, lines 65-68:

> A radome wall of this invention utilizes a polycarbonate material in the construction of a c-sandwich wall and thereby overcomes the problems set forth above. (Emphasis added.)

This is also clear from the general format of all patent applications which typically discuss prior art problems and then the improvements made by the patented invention.

Therefore, it is clear that *Greene's* discussion of prior art problems are not to lead one

[5] See the Examiner's Advisory Action, attached hereto as Appendix A.

skilled in the art to *Coffy*, but to lead one skilled in the art to note the improvements invented by *Greene* which solve those prior art problems.

On another point, the Advisory Action also explains in pertinent part that:

> [T]he objective of the patents [*Greene* and *Coffy*] is the same, the manufacture of radomes used in space/aeronautical/avionics, and where the radome must be transparent to electromagnetic waves and have aerodynamic properties.

This is also not accurate. The objectives of *Greene* and *Coffy* are not the same; the objective of each is not to manufacture radomes. Only *Greene* teaches a radome. A conclusion that both of these cited references teach the manufacture of radomes cannot be reached from a reading of *Coffy* apart from the knowledge of the applicants' claimed invention.

The law is clear that the teaching of the desirability of combining references must not come from the applicants' invention. "There must be a reason or suggestion in the art for selecting the procedure used, *other* than the knowledge learned from the applicants' disclosure." See In re Dow Chemical Company, 837 F.2d 469,473, 5 USPQ 2d 1529, 1532 (Fed. Cir. 1989) (with emphasis added).

The Advisory Action also states in pertinent part that:

> *Greene* also teaches polyarylate material ... [t]he patent to *Coffy* employs VECTRAN ... which is a polyester and contains polyarylate fibers and called LCP's [sic]. Such a composite is ideal for the multi-layered type of radome set forth by *Greene*, particularly since *Coffy* clearly admits that the composite material has remarkable transparency to EM waves ... The motivation to combine lies in *Coffy*, citing the EM properties essential to radomes...

As discussed in detail above, *Greene* considered polyarylate but rejected it favor of polycarbonate. Therefore, it is clearly not the ideal material for *Greene's* radome. Moreover, also as discussed above, *Greene* does not mention fibers at all. Instead of fibers for strength, *Greene*

teaches a sandwich wall construction with a special core. Given these and other opposing teachings by these two references, one cannot properly conclude that the references would or should be combined.

> A critical step in analyzing the patentability of claims pursuant to section 103(a) is casting the mind back to the time of the invention, to consider the thinking of one of ordinary skill in the art, guided only by the prior art references and the then-accepted wisdom in the field ...
>
> Close adherence to this methodology is especially important in cases where the very ease with which the invention can be understood may prompt one to fall victim to the insidious effect of a hindsight syndrome wherein that which only the invention taught is used against its teacher.

See In re Kotzab, 217 F.3d 1365, 1369, 55 USPQ 2d 1313, 1316 (Fed. Cir. 2000), with citations and quotations omitted.

In this case, without the benefit of the knowledge of the applicants' invention and without the use of hindsight, one of ordinary skill in the art would not combine the cited references to reject the applicants' claimed invention.

The reasoning for combining the cited references: (a) does not overcome the fundamental, antithetical, diametrically opposite nature of the two references; and (b) does not satisfy the requirement that there be some motivation, suggestion or teaching in the references of the desirability of making the specific combination claimed by the applicants, supported by some objective teaching of record.

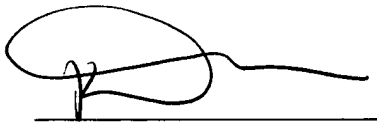
I. CONCLUSION

In summary, the applicants' claims 1-24 are not obvious over the cited references *Greene* and *Coffy* for at least the reasons set forth herein. The cited references include teachings which teach away from many of the applicants' claims, and the cited references include teachings

which are the opposite of one another. The references are not properly combinable. Finally, the applicants further submit that the necessity to (improperly) combine references of such an antithetical nature is another indication that applicants' claims are indeed novel and non-obvious.

Accordingly, the applicants' respectfully request that the Board find that claims 1-24 are in condition for allowance.

Respectfully submitted,



Kirk Teska
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Thomas E. Thompkins, Jr.
Reg. No. 47,136

CLAIMS APPENDIX

The following is a copy of the claims involved in this Appeal:

1. A radome or feedome comprising at least one rigid panel including composite material having polyester-polyarylate fibers in a rigid resin matrix material.

2. The radome or feedome of claim 1 in which the at least one rigid panel includes a first composite material skin having polyester-polyarylate fibers in a rigid resin matrix material.

3. The radome or feedome of claim 2 in which the at least one rigid panel includes second, opposing composite material skins having polyester-polyarylate fibers in a rigid resin matrix material and a core between the first and second composite material skins.

4. The radome or feedome of claim 3 in which the core is a low density material.

5. The radome or feedome of claim 1 in which the rigid resin matrix material is epoxy.

6. The radome or feedome of claim 1 in which the rigid resin matrix material is polyester.

7. The radome or feedome of claim 1 in which the rigid resin matrix material is polybutadiene.

8. The radome or feedome of claim 1 in which the rigid resin matrix material is cyanate ester.

9. The radome or feedome of claim 1 in which the rigid resin matrix material is vinyl ester.

10. The radome or feedome of claim 1 in which the rigid resin matrix material is a blend of at least two of: epoxy, polyester, polybutadiene, cyanate ester, and vinyl ester.

11. The radome or feedome of claim 1 in which the polyester-polyarylate fibers are between 100 denier and 5000 denier.

12. A radome or feedome comprising at least one rigid panel including composite material skins with polyester-polyarylate fibers in a rigid resin matrix material and a core therebetween.

13. A rigid radome or feedome with reduced radio frequency loss comprising:

a first skin including polyester-polyarylate fibers in a rigid resin matrix material;

a second skin including polyester-polyarylate fibers in a rigid resin matrix material; and

a core disposed between the first skin and the second skins.

14. The radome or feedome of claim 13 wherein the core is a low density material.

15. The radome or feedome of claim 13 wherein the rigid resin matrix material is epoxy.

16. The radome or feedome of claim 13 wherein the rigid resin matrix material is polyester.

17. The radome or feedome of claim 13 wherein the rigid resin matrix material is polybutadiene.

18. The radome or feedome of claim 13 wherein the rigid resin matrix material is cyanate ester.

19. The radome or feedome of claim 13 in which the rigid resin matrix material is vinyl ester.

20. The radome or feedome of claim 13 in which the rigid resin matrix material is a blend of at least two of: epoxy, polyester, polybutadiene, cyanate ester, and vinyl ester.

21. The radome or feedome of claim 13 in which the polyester-polyarylate fibers are between 100 denier and 5000 denier.

22. A method of producing a radome or feedome, the method comprising forming at least one rigid panel including composite material having polyester-polyarylate fibers in a rigid resin matrix.

23. The method of claim 22 wherein the at least one rigid panel includes a composite material skin having polyester-polyarylate fibers in a rigid resin matrix material.

24. A method of producing a radome or feedome, the method comprising:

forming a first skin comprised of polyester-polyarylate fibers in a rigid resin matrix;

forming a second skin comprised of polyester-polyarylate fibers in a rigid resin matrix;

disposing a core between the first and the second skins; and

bonding the skins to the core.

EVIDENCE APPENDIX

No evidence has been submitted pursuant to 37 C.F.R. §§ 1.130, 1.131 or 1.132, and no evidence has been entered by the Examiner.

Support for the introductory portion of the "Summary of Claimed Subject Matter" section of this Appeal Brief may be found in the applicants' specification.

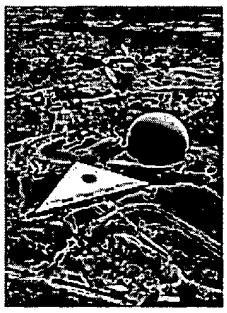
Further, the applicants attach hereto a picture of a radome at the Telecommunications Museum of Pleumeur – Bodou in France, which is also reproduced in this Appeal Brief at page 2, as another example of a radome.

French version

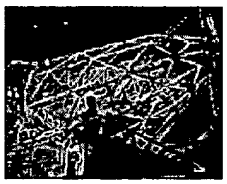
RADOME
Musée des Télécoms

With more than 100000 visitors welcomed each year, the Telecommunications museum of Pleumeur-Bodou is classed as one of the best sites of the Cotes d'Armor which cannot be overlooked. Opened in 1991, it is the only national telecommunications museum entirely realized and implemented by France Telecom.
A strange place where past, present and future are brought together with a bonus a fascinating show just at the foot the giant white radar dome.

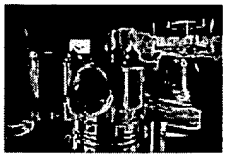
AN UNFORGETTABLE VISIT OF AN EXCEPTIONAL PLACE



A Place full of History
The Telecommunications museum first took place in the Radar dome, an immense white ball of 50 meters in height which shelters a gigantic cone shaped antenna which weighs 340 tons. It's thanks to this antenna that for the first time ever on the night of July 11 1962, that televised images were broadcast direct from America via the Telstar satellite.



A fascinating Show
Classed as a historical monument, the antenna and the Radar dome now play the roles of the main actors in a superb show. A show which is entirely original since its first public showing in May 2000. A show at the cutting edge of technology which principally uses magical scenes in a majestical setting.
On board a mobile platform, you will start with a tour of the antenna, but not just any tour: a musical voyage of images of the dawning of the world right up until the present and the future..... Experience all the emotions !



From the Chappe Tower to the Internet
To add more to this magnificent show, the museum offers you a theme based tour on a circuit of almost 3000 metres of exhibitions and presentations. Its an original piece which attracts children as well as adults. Actually take part in the laying of underwater cables in the hold of the Agamemnon, one of the first cable laying boats. From the Leon Thévenin bridge dive into the depths of the sea to meet the under water robot, the SCARAB ..... In the white room awaits a universe of satellites and

RELATED PROCEEDINGS APPENDIX

There are no related proceedings, as noted in the "Related Appeals and Interferences" section of this Appeal Brief.

Consequently, there are no decisions which have been rendered by a court or the Board in any related proceeding.

APPENDIX A

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/621,155	07/16/2003	Marvin I. Fredberg	RAY-133J	1204

7590 05/17/2005

Iandiorio & Teska
260 Bear Hill Road
Waltham, MA 02451-1018

EXAMINER	
WIMER, MICHAEL C	
ART UNIT	PAPER NUMBER
2828	

DATE MAILED: 05/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Advisory Action Before the Filing of an Appeal Brief	Application No. 10/621,155	Applicant(s) FREDBERG ET AL.	
	Examiner Michael C. Wimer	Art Unit 2828	

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

THE REPLY FILED 04 May 2005 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

1. ☒ The reply was filed after a final rejection, but prior to or on the same day as filing a Notice of Appeal. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114. The reply must be filed within one of the following time periods:
   a) ☐ The period for reply expires _____ months from the mailing date of the final rejection.
   b) ☒ The period for reply expires on: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.

   Examiner Note: If box 1 is checked, check either box (a) or (b). ONLY CHECK BOX (b) WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

NOTICE OF APPEAL

2. ☐ The Notice of Appeal was filed on _____. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

AMENDMENTS

3. ☐ The proposed amendment(s) filed after a final rejection, but prior to the date of filing a brief, will not be entered because
   (a) ☐ They raise new issues that would require further consideration and/or search (see NOTE below);
   (b) ☐ They raise the issue of new matter (see NOTE below);
   (c) ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
   (d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.

   NOTE: _____. (See 37 CFR 1.116 and 41.33(a)).
4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).
5. ☐ Applicant's reply has overcome the following rejection(s): _____.
6. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).
7. ☐ For purposes of appeal, the proposed amendment(s): a) ☐ will not be entered, or b) ☐ will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.

   The status of the claim(s) is (or will be) as follows:
   Claim(s) allowed: _____.
   Claim(s) objected to: _____.
   Claim(s) rejected: _____.
   Claim(s) withdrawn from consideration: _____.

AFFIDAVIT OR OTHER EVIDENCE

8. ☐ The affidavit or other evidence filed after a final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).
9. ☐ The affidavit or other evidence filed after the date of filing a Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing a good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).
10. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

REQUEST FOR RECONSIDERATION/OTHER

11. ☒ The request for reconsideration has been considered but does NOT place the application in condition for allowance because: See Continuation Sheet.
12. ☐ Note the attached Information Disclosure Statement(s). (PTO/SB/08 or PTO-1449) Paper No(s). _____
13. ☐ Other: _____.

Michael C. Wimer
Primary Examiner
Art Unit: 2828

Continuation of 11. does NOT place the application in condition for allowance because: Applicant states that Greene does not teach or suggest fibers in the radome skin. Greene is cited as teaching the basic multilayered radome construction as a general representation of the antenna radome art. Greene sets forth the prior art in Figures 1 and 2, and discusses the problems of prior art radomes in column 1, lines 33-57, and clearly suggests to the antenna artisan in lines 51-57, that selection of alternate materials must be performed while maintaining electrical performance and dielectric strength. Those two reasons are precisely why the skilled artisan would look to Coffy. Greene chooses materials and construction as set forth in Figures 3-5 and Table II. However, the objective in both patents is the same: the manufacture of radomes used in space/aeronautical/avionics, and where the radome must be transparent to electromagnetic waves and have aerodynamic properties. Greene describes the prior art as having quartz fibers/woven cloth laminated upon epoxy reinforced honeycomb materials/thermoplastic (i.e., thermoformed, via pressure and temperature or via molding). Green also teaches polyarylate material. The teachings of the references are not diametrically opposite as alleged by applicant. The patent to Coffy employs VECTRAN (registered trademark), which is a polyester and contains polyarylate fibers and called LCP's. Such a composite is ideal for the multi-layered type of radome set forth by Greene, particularly since Coffy clearly admits that the composite material has remarkable transparency to EM waves. Such a quality is essential in the radome art. The other two qualities cited by Coffy, excellent fire resistance and thermal isolation, are ideal for radomes used in space. The motivation to combine lies in Coffy, citing the EM properties essential to radomes. As pointed out by applicant in the REMARKS, Coffy specifically mentions that the advantage in using LCP's is that they may be exposed to microwaves without decomposing, and the reason that they are transparent to EM waves is to provide a radome (i.e., a radar-dome used in the microwave bands). Since sufficient evidence exists to employ the Coffy materials in radome construction, such as set forth in Greene, then the motivation to combine the references has been clearly set forth. The final Office action rejection stands.